CHAPTER 6
Proposed Minimum Level Criteria, Monitoring, Prevention and Adaptive Management Plan

PROPOSED MINIMUM LEVEL CRITERIA

Definition of Significant Harm

As mentioned in previous sections, the primary sources of water coming into Lake Istokpoga are rainfall and flows from Arbuckle and Josephine Creeks. Water levels in Lake Istokpoga are controlled by operation of water control structures (S-68 and G-85) and guided by a regulation schedule adopted by the U.S. Army Corps of Engineers and the SFWMD (**Figure 11**). Under the existing regulation schedule, typical regional weather patterns and present levels of flows from the creeks, it is unlikely that *significant harm* due to low water levels would occur. According to an analysis of water level requirements (presented in **Chapters 2 and 4**), *harm* to the resource functions could occur when water levels fall below the 36.5 feet NGVD criterion, which is below the lower level of the regulation schedule. Water supply releases from Lake Istokpoga are halted when water levels fall below 37.5 feet NGVD during the end of the dry season (**Figure 11**). At this point, lake levels are essentially controlled by local rainfall and evaporation. While water levels are within the range specified in the regulation schedule, the minimum needs of water supply, flood control, navigation and environmental systems are met and a "*no harm*" condition is maintained.

For navigation and recreational interests, the duration of water levels below 36.5 feet NGVD that leads to *harm* is not clearly defined. Prolonged low water levels impact navigation and recreation, as well as recreation-based businesses along Lake Istokpoga, by limiting access to lake resources. Under the current regulation schedule (**Figure 11**) these effects are usually temporary and occur only when a controlled drawdown is conducted to enhance shoreline vegetation communities.

A significant harm condition for Lake Istokpoga is based primarily on impacts to the lake's biological communities that last more than two years. Based on examination of technical information, the definition of *significant harm* for Lake Istokpoga is:

> **Significant Harm** is defined to occur to the Lake Istokpoga system when surface water levels fall below 36.5 feet NGVD for 20 weeks (140 days) or longer, more frequently than every four years.

While periodic low water events can provide important environmental benefits to the lake's resources (FWC 2000, 2002), more extreme or frequently recurring low water events could potentially have longer term (>2 years) impacts to littoral zone wetlands,

wildlife, recreation and navigation opportunities, as well as to the local economy. This *significant harm* definition is intended to address three important aspects of a defined low water event on Lake Istokpoga's resources: 1) the definition of a low water event, (i.e., levels must fall below 36.5 feet); 2) the maximum duration of an event; and 3) the maximum return frequency of an event. The rationale for each criterion is provided below.

Rationale for Proposed Criteria

The maximum duration of a low water event was defined, based on experience gained from the 2001 drawdown. This event allowed biologists to observe and document impacts to lake resources and monitor the time required for these resources to recover to a "pre-drawdown" condition. Biological data collected before and after this event indicated the drawdown caused an impact to fish resources. However, sport fish catches and catch rates were comparable to pre-drawdown levels the two years following the drawdown (see **Table 10**). This drawdown also allowed chemical and mechanical hydrilla control, enhancement of littoral zone wetlands and removal of accumulated organic sediments, which improved both lake vegetation communities and water quality. The magnitude and duration of this drawdown event were comparable to naturally-occurring low water events experienced before implementation of the regulation schedule (see **Figure 16** and **Table 13**). Based on this knowledge, the point at which a low water event would cause *significant harm* to the system would be the result of a condition where water levels fall below 36.5 feet for a longer period of time than the 19 weeks duration of the 2001 drawdown.

The return frequency of drawdown events (once every four years) was based on consideration of wetland hydroperiod and fish reproduction requirements. The current wetland communities residing along Lake Istokpoga range from hardwood and cypress swamp on higher sites, littoral zone wetlands on mesic sites and submerged aquatic beds near the shoreline (see **Figure 18**). When water levels fall below 36.5 feet NGVD, the water table is more than three feet below the soil surface in lake swamp communities, while water levels are near the soil surface in littoral wetlands and shoreline submerged aquatic vegetation (SAV) becomes exposed. Typically, deep water marsh communities have average annual hydroperiods of 10–12 months (see **Table 15**), while SAV beds are always inundated, except during severe drought conditions. If low water events occur more often than once every four years, the annual average hydroperiod for lake wetlands may be reduced below the typical range for these community types. When lake levels fall below 36.5 feet NGVD, there is no surface water within the littoral zone marsh, which is important habitat for fish spawning and juvenile fish foraging. If extreme low water levels persist throughout the fish spawning season, a year class of fish may be impacted. An impact to two such year classes within a several year period would likely cause multiyear impacts to fish populations. To allow a full recovery of the fisheries resource and a full year of successful reproduction of the restored fish population, a four-year return frequency is proposed to protect the fisheries resource of Lake Istokpoga from significant harm.

Basis of Proposed Criteria

Proposed minimum level criteria for Lake Istokpoga are linked to the concept of protecting valued ecological components from *significant harm*. The specific ecological resources identified for Lake Istokpoga are wetlands (aquatic beds, marshes and swamps), and associated fish and wildlife communities. The ecologically and economically important fish and wildlife resources of Lake Istokpoga depend on healthy wetland communities as sources of food, spawning sites, nursery areas for juveniles, nesting sites, shelter and protection, as well as other habitat values. These wetlands also provide other important functions, such as water quality improvement and stabilization of shorelines.

Protection from Significant Harm

During very dry periods, or a managed drawdown, prolonged low water conditions may occur that lead to *significant harm*. Since implementation of the Lake Istokpoga Regulation Schedule, there have been no such events caused by low rainfall or drought. However, determination of the point of *significant harm* may be a useful guide for future lake management if demands for water increase.

Technical Criteria

Based on the above information, SFWMD staff proposes the following MFL Criteria for Lake Istokpoga:

> A MFL violation occurs within Lake Istokpoga when surface water levels fall below 36.5 feet NGVD for 20 or more weeks, more often than once every four years.

The proposed MFL for Lake Istokpoga is based on the assumption that *significant harm* can occur to the lake's ecological resources when water levels fall below 36.5 feet NGVD. The MFL criteria are intended to address low water levels that occur due to regional drought conditions and/or withdrawals of water from the lake or adjacent aquifers. Water level reductions that occur as part of a managed lake drawdown for enhancement of lake resources are excluded from this definition.

Ability to Meet Proposed Criteria

Analysis of the current regulation schedule and a review of operational policies for Lake Istokpoga indicate the proposed MFL will be met under current conditions and for the foreseeable future. Furthermore, the proposed MFL is not expected to impact navigation, recreation, water supply or natural systems since the criteria are well below the current operating schedule for the lake (**Figure 11**). Potential exceedances would occur only during a controlled drawdown event. However, periodic drawdowns of the lake below 36.5 feet NGVD, as conducted during 2001 by the FWC, are beneficial to the lake and may be required as part of an overall lake management strategy. It is recognized

that under certain circumstances, it may be necessary to conduct controlled drawdowns of magnitudes or frequencies that exceed the proposed MFL criteria in order to enhance the lake's ecological resources.

The MFL statues and rules do not provide the authority or legal basis to require that low water events occur. The MFL does provide guidelines as to the magnitude and duration of drawdown events that may occur without causing long-term damage to the resource, and as a means to ensure that such damaging low water events do not occur due to consumptive use withdrawals. As such, the MFL criteria do not restrict the ability of the SFWMD, FWC and FDEP to lower lake levels as deemed necessary for aquatic weed control, fisheries management, shoreline enhancement or dredging of navigation channels.

Monitoring Strategy

Over the past decades, the SFWMD has continuously monitored water levels at several stations in Lake Istokpoga (e.g., see **Table 11**). The same stations can be used to track MFL exceedances within the lake. Since implementation of more conservative water management efforts after 1985, extreme low water events (<36.5 feet NGVD) have occurred only during a managed drawdown event. Furthermore, future low water events are anticipated to occur only under controlled conditions for purposes of environmental enhancement.

During the 2001 vegetation enhancement project, biological and hydrological monitoring was carried out by the FWC and the SFWMD, much of which was required as part of the Environmental Impact Statement and permit from the USEPA. Future managed drawdown events, could provide opportunities to conduct pre and post-drawdown biological and hydrological monitoring and further measure the impact of low water events on Lake Istokpoga's resources. The FWC conducts fish catch surveys and estimates of the extent of hydrilla in the lake each year (see **Table 10**). In addition, the distribution of major littoral zone communities is monitored by the FDEP and FWC to gauge the success of ongoing vegetation enhancement projects. These efforts provide a broad range of monitoring data that can be used to directly address how low water events impact the resource.

It is recommended that vegetation monitoring associated with controlled drawdown events include more emphasis on the multiyear responses of fringing wetland vegetation, especially cypress communities, to low water levels. The current monitoring programs could be expanded or enhanced to incorporate the proposed MFL wetland resource protection concerns. No additional biological monitoring parameters in Lake Istokpoga are proposed.

Prevention Strategy

Since the proposed *significant harm* criteria are not presently being exceeded, a MFL Recovery Strategy (Section 373.0421(2), F.S.) does not need to be developed to

protect the resource. Furthermore, under the current operational plan and regulation schedule, *significant harm* to the water body is not expected to occur in the near future, and a MFL Prevention Strategy (Section 373.0421(2), F.S.) is not required.

Low water events play an important role in the overall health of the lake ecosystem and other projects are planned that may address some of these issues. These projects include the potential for a reservoir in the Indian Prairie area south of the lake, which may allow more flexibility in the regulation schedule. The Lake Okeechobee Watershed CERP Project will evaluate the existing regulation schedule and recommend changes to enhance the lake's biological resources for long-term management.

Research Recommendations

As previously stated, the SFWMD and FWC are actively involved in monitoring biological and hydrological parameters both before and after controlled drawdown events. The SFWMD should continue this partnership so the goals of both projects (the environmental enhancement project and the MFL) are met. Currently, birds, fish, aquatic and littoral zone communities are being monitored, as well as water quality and lake water levels.

Additional recommended research parameters that could be included in future studies include:

- Better monitoring of stream inflow and water use in these basins
- Groundwater and surface water interactions
- Evaporation rates on Lake Istokpoga
- Better understanding of a water budget for Lake Istokpoga
- Better understanding of the hydrological needs for a sustainable fringing lake swamp (bald cypress and mixed hardwood)

Adaptive Management

The proposed MFL criteria are based on best available information with the understanding that more information is needed to refine assumptions used in criteria development. Ongoing and proposed research and monitoring efforts in the Lake Istokpoga watershed will continue to provide more information to improve our understanding of Lake Istokpoga's resources. This information will provide SFWMD staff an opportunity to reevaluate the proposed criteria and refine the MFL in accordance with regional water supply plan development and implementation activities.

The Lake Okeechobee Watershed Project, a part of the CERP, may potentially affect regulation of water levels in Lake Istokpoga includes. This project will reevaluate and recommend changes to the Lake Istokpoga Regulation Schedule and study the need for additional water storage facilities in the watershed. If significant changes to lake management occur that may require reevaluation of MFL criteria based on new

information or altered operational criteria, such changes will be considered in the next Lake Istokpoga MFL update, which is scheduled for 2010, or sooner if significant changes to lake management are proposed.

The criteria developed in this document should be used as the basis for SFWMD rule development and to evaluate the effect of watershed planning studies (including modeling). Monitoring of proposed increases in water use on the ability to meet these MFL criteria should also be considered as a factor in the issuance of consumptive use permits, both individually and cumulatively, within the Kissimmee Basin Planning Area. Current research and monitoring efforts by the SFWMD, FWC, FDEP and local entities are recommended to continue, and additional research and monitoring efforts are suggested as means to provide useful data for refinement of MFL criteria. Monitoring programs associated with drawdown and ecological enhancement projects are recommended to include an enhanced focus on wetland monitoring that is consistent with the needs of gauging *harm* and *significant harm* to these resources.